Claims

1. A composition comprising a placental stem cell which expresses at least one marker selected from the group consisting of: Thy-1, OCT-4, SOX2, SSEA3, SSEA4, TRA1-60, TRA1-81, Lefty A, FGF-4, Rex-1 and TDGF-1.

2. A composition comprising a placental stem cell which expresses at least two markers selected from the group consisting of: Thy-1, OCT-4, SOX2, SSEA3, SSEA4, TRA1-60, TRA1-81, Lefty A, FGF-4, Rex-1 and TDGF-1.

3. A composition of claim 1 that is ATCC deposit No. _____.

4. A pharmaceutical composition comprising an effective amount of the composition of claim 1 and a pharmaceutically acceptable carrier.

5. A method of making a cardiomyocyte comprising culturing a stem cell of claim 1 in a media that contains an appropriate amount of ascorbic acid 2-phosphate under appropriate conditions and for a sufficient period of time for the stem cell to differentiate into a cardiomyocyte.

6. A cardiomyocyte obtained from the process of claim 5, which expresses at least one marker selected from the group consisting of: MLC-2A, MLC-2V, hANP, cTnT, alpha- actinin, GATA-4 and Nkx 2.5.

7. A cardiomyocyte obtained from the process of claim 5, which expresses at least two markers selected from the group consisting of: MLC-2A, MLC-2V, hANP, cTnT, alpha- actinin, GATA-4 and Nkx 2.5.

8. A cardiomyocyte that is ATCC deposit No. _____.

9. A pharmaceutical composition comprising an effective amount of a cardiomyocyte of claim 6 and a pharmaceutically acceptable carrier.

10. A method of determining whether a test agent is toxic to a cardiomyocyte, comprising contacting the cardiomyocyte of claim 6 with an appropriate amount of the test agent for a time sufficient for a toxic effect on the cardiomyocyte to be detected, and determining whether the test agent has a toxic effect on the cardiomyocyte.

11. A method of determining a metabolic product of a test agent comprising contacting the cardiomyocyte of claim 6 with an appropriate amount of the test agent for a time sufficient for the test agent to be metabolized, and detecting the presence of the metabolized product.

12. A method of making a hepatocyte comprising culturing a stem cell of claim 1 in a media that contains an appropriate amount of dexamethasone, ITS, EGF, FGF-2, FGF-4, FGF-7, HGF, phenobarbital, Type-I collagen or a combination thereof under appropriate conditions and for a sufficient period of time for the stem cell to differentiate into a hepatocyte.

13. A hepatocyte obtained from the process of claim 12, which expresses at least one marker selected from the group consisting of: albumin, CYP1A1, CYP1A2, CYP2B6, CYP2C8, CYP2C9, CYP2D6, CYP3A4, AFP, A1AT, HNF1, HNF4 and C/EBP alpha.

14. A hepatocyte obtained from the process of claim 12, which expresses at least two markers selected from the group consisting of: albumin, CYP1A1, CYP1A2, CYP2B6, CYP2C8, CYP2C9, CYP2D6, CYP3A4, AFP, A1AT, HNF1, HNF4 and C/EBP alpha.

15. A hepatocyte that is ATCC deposit No. _____.

16. A pharmaceutical composition comprising an effective amount of a hepatocyte of claim 13 and a pharmaceutically acceptable carrier.

17. A method of determining whether a test agent is toxic to a hepatocyte comprising contacting the hepatocyte of claim 13 with an appropriate amount of the test agent for a time sufficient for a toxic effect on the hepatocyte to be detected, and determining whether the test agent has a toxic effect on the hepatocyte.

18. A method of determining a metabolic product of a test agent comprising contacting the hepatocyte of claim 13 with an appropriate amount of the test agent for a time sufficient for the test agent to be metabolized, and detecting the presence of the metabolized product.

19. A method of making a pancreatic cell comprising culturing a stem cell of claim 1 in a media that contains an appropriate amount of nicotinamide, dexamethasone, ITS, matrigel or a combination thereof under appropriate conditions and for a sufficient period of time for the stem cell to differentiate into a pancreatic cell.

20. A pancreatic cell obtained from the process of claim 19, which expresses at least one marker selected from the group consisting of: Pax6, Pdx1, insulin, glucagon, and Nkx2.2.

21. A pancreatic cell obtained from the process of claim 19, which expresses at least two markers selected from the group consisting of: Pax6, Pdx1, insulin, glucagon, and Nkx2.2.

22. A pancreatic cell that is ATCC deposit No. _____.

23. A pharmaceutical composition comprising an effective amount of a pancreatic cell of claim 20 and a pharmaceutically acceptable carrier.

24. A method of determining whether a test agent is toxic to a pancreatic cell comprising contacting the pancreatic cell of claim 20 with an appropriate amount of the test agent for a time sufficient for a toxic effect on the pancreatic cell to be

detected, and determining whether the test agent has a toxic effect on the pancreatic cell.

25. A method of determining a metabolic product of a test agent comprising contacting the pancreatic cell of claim 20 with an appropriate amount of the test agent for a time sufficient for the test agent to be metabolized, and detecting the presence of the metabolized product.

26. A method of making a neural cell comprising culturing a stem cell of claim 1 in a media that contains an appropriate amount of trans-retinoic acid or FGF-4 under appropriate conditions and for a sufficient period of time for the stem cell to differentiate into a neural cell.

27. A neural cell obtained from the process of claim 26, which expresses at least one marker selected from the group consisting of: GFAP, CNP, beta-tubulin III, Nestin, GAD, NSE, NF-M and MBP.

28. A neural cell obtained from the process of claim 26, which expresses at least two markers selected from the group consisting of: GFAP, CNP, beta-tubulin III, Nestin, GAD, NSE, NF-M and MBP.

29. A neural cell that is ATCC deposit No. _____.

30. A pharmaceutical composition comprising an effective amount of a neural cell of claim 27 and a pharmaceutically acceptable carrier.

31. A method of determining whether a test agent is toxic to a neural cell comprising contacting the neural cell of claim 27 with an appropriate amount of the test agent for a time sufficient for a toxic effect on the neural cell to be detected, and determining whether the test agent has a toxic effect on the neural cell.

32. A method of determining a metabolic product of a test agent comprising contacting the neural cell of claim 27 with an appropriate amount of the test agent

for a time sufficient for the test agent to be metabolized, and detecting the presence of the metabolized product.

33. A method of making a vascular endothelial cell comprising culturing a stem cell of claim 1 in a media that contains matrigel under appropriate conditions and for a sufficient period of time for the stem cell to differentiate into a vascular endothelial cell.

34. A vascular endothelial cell obtained from the process of claim 33, which expresses the FLT-1 marker.

35. A vascular endothelial cell obtained from the process of claim 33, which has physical characteristics of cells shown in Figure 10.

36. A vascular endothelial cell that is ATCC deposit No. _____.

37. A pharmaceutical composition comprising an effective amount of a vascular endothelial cell of claim 34 and a pharmaceutically acceptable carrier.

38. A method of determining whether a test agent is toxic to a vascular endothelial cell comprising contacting the vascular endothelial cell of claim 34 with an appropriate amount of the test agent for a time sufficient for a toxic effect on the vascular endothelial cell to be detected, and determining whether the test agent has a toxic effect on the vascular endothelial cell.

39. A method of determining a metabolic product of a test agent comprising contacting the vascular endothelial cell of claim 34 with an appropriate amount of the test agent for a time sufficient for the test agent to be metabolized, and detecting the presence of the metabolized product.